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only service in the rank of professor was counted toward an allowance. The other change makes retirement after twenty-five years of service possible only in the case of disability unfitting the teacher for active service. Except in the case of such disability, the teacher can, under the rules as now framed, claim a retiring allowance only upon attaining the age of sixty-five. Formerly a professor might retire after twenty-five years of service. This change in the rules, does not, however, deprive the widow of a teacher who has had twenty-five years of service of her pension. The action was taken in view of the fact that many men were willing to retire from the position of teachers and go into business, or because they were tired of teaching, or for other reasons entirely foreign to those for which the rule was intended to provide. Only a small minority of those retiring under 65 years of age did so because of ill health.

The third section of the report is devoted to tax-supported institutions. It states in detail the reasons which have governed the trustees of the foundation in dealing with state institutions. Agricultural education and the agricultural college are also treated at length. The trustees make clear their intention to ask of the institutions of every state whether the university and the college of agriculture are competing or cooperating parts of a state system of education. The low standards and general demoralization resulting from the competition of these two types of tax-supported institutions in the various states are definitely pointed out.

The fourth section of the report is devoted to educational administration, and deals with such subjects as financial reports, college advertising, which has in many institutions developed to formidable proportions, the function of the college trustee and other administrative topics. The problems here taken up are those of immediate practical significance in the operation of colleges and universities. The foundation announces that it will distribute within a short time a bulletin suggesting a simple form of treasurer's report which it hopes may obtain general use. It is note-

worthy that only a small proportion of the colleges and universities calling on the public for support print a straightforward financial statement showing what they do with the money collected from the public. An analysis is here given of the duties of the college trustee and the importance of choosing men who will perform these duties.

The fifth section of the report is occupied with more distinctly educational problems, such as the articulation of high school and college, the weighting of college entrance requirements in favor of the classics, the relative value of educational criticism and educational construction. The whole effort in this part of the report, as in former reports, is to urge upon all the colleges in the country, whether state controlled or privately endowed, the necessity of articulation with the state system of education. In this section, also, the president takes up the statement which has been made in several quarters that the foundation might become an arbitrary force in education, and shows that the real power of the foundation is dependent upon its fair discussion of educational issues. The amount of money in the hands of the foundation is insignificant compared with the college endowments themselves, and the president insists that its most substantial asset comes from a fair, impartial and public handling of educational questions.

Following the report of the president is the report of the treasurer. In this matter the foundation has followed the advice which it gives to other institutions and prints a detailed statement, showing not only the larger items of expense, but even the individual salaries which are paid.

The report may be obtained by writing to The Carnegie Foundation, 576 Fifth Avenue, New York City.

SCIENTIFIC NOTES AND NEWS

DR. J. D. VAN DER WAALS, professor of experimental physics in the University of Amsterdam, has been elected a foreign associate of the Paris Academy of Sciences.

DR. S. WEIR MITCHELL celebrated his eightieth birthday on February 15. On the following day he gave a lecture before the College of Physicians of Philadelphia on "William Harvey, the Discoverer of the Circulation of the Blood."

A TESTIMONIAL banquet will be tendered Dr. William H. Welch, of Johns Hopkins University, on April 2. Gold portrait medallions of Professor Welch will be presented to him, and to the Johns Hopkins University and the Medical and Chirurgical Faculty of Maryland.

THE Italian Royal Geographical Society has conferred a gold medal on Commander Robert E. Peary, a silver medal on Captain Robert A. Bartlett, a gold medal on Lieutenant Ernest H. Shackleton and a silver tablet on the Duke of the Abruzzi for his expedition to the Himalayas. Professor W. M. Davis, of Harvard University, was made a correspondent of the society.

PROFESSOR G. H. F. NUTTALL, F.R.S., Quick professor of biology in the University of Cambridge, has been awarded the Mary Kingsley medal by the Liverpool School of Tropical Medicine.

DR. JOHN M. COULTER, professor of botany in the University of Chicago, has been elected president of the Illinois Academy of Science.

M. GURBAIN, of the University of Paris, has been elected president of the French Society of Physical Chemistry.

MR. JAMES E. HOWARD has been appointed an engineer physicist in the U. S. Bureau of Standards.

THE University of Pennsylvania has conferred its doctorate of science on Mr. Samuel Rea, third vice-president of the Pennsylvania railroad and Mr. George S. Webster, chief of the Bureau of Surveys of the City of Philadelphia.

THE officers of the Washington Academy of Sciences for 1910 are: *President*, C. D. Walcott; *Vice-presidents*—Anthropological Society, Walter Hough; Archeological Society, Mitchell Carroll; Biological Society, T. S. Palmer; Botanical Society, David White;

Chemical Society, H. W. Wiley; Engineers' Society, B. R. Green; Entomological Society, A. D. Hopkins; Foresters' Society, Gifford Pinchot; Geographic Society, Henry Gannett; Geological Society, F. L. Ransome; Historical Society, J. D. Morgan; Medical Society, Louis Mackall; Philosophical Society, R. S. Woodward; *Corresponding Secretary*, Frank Baker; *Recording Secretary*, Bailey Willis; *Treasurer*, Arthur L. Day; *Additional Managers*, L. O. Howard, O. H. Tittmann, B. W. Evermann, L. A. Bauer, C. H. Merriam, C. F. Marvin, Geo. M. Kober, F. V. Coville, E. W. Parker.

A COURSE of three lectures on "Amphioxus" was given at the Imperial College of Science and Technology, Royal College of Science, South Kensington, by Professor E. W. Macbride, D.Sc., LL.D., F.R.S., February 14, 21 and 28.

FOUR lectures on "The Anatomy and Relationships of the Negro and Negroid Races" were delivered at the Royal College of Surgeons by Professor Arthur Keith, conservator of the museum, on February 14, 16, 18 and 21.

THE Julius Thomsen memorial lecture of the Chemical Society, London, was delivered on February 17 by Sir Edward Thorpe.

IN memory of the late Dr. Ludwig Mond's scientific eminence and his generous benefaction of £3,000 towards the building of the Institute of Physiology at University College, London, the college committee has resolved to name the biochemistry research department of the institute "The Ludwig Mond Biochemistry Research Laboratory."

DR. CHARLES R. BARNES, professor of plant physiology at the University of Chicago and eminent for his contributions to this subject, one of the editors of the *Botanical Gazette*, president of the Botanical Society of America in 1903 and vice-president of the American Association for the Advancement of Science in 1899, died on February 24, at the age of fifty-one years.

DR. AMOS EMERSON DOLBEAR, for thirty-two years professor of physics at Tufts College, the author of numerous contributions to phys-

ics and an inventor of distinction, died on February 23, at the age of seventy-three years.

PROFESSOR J. EDMUND WRIGHT, associate professor of mathematics in Bryn Mawr College, died on February 20 of heart disease. He was an Englishman and won distinguished honors at the University of Cambridge, being senior wrangler in 1900, first in the second part of the mathematical tripos in 1901, and Smith's prizeman in 1902, and has been for the past seven years a fellow of Trinity College, Cambridge. He was called to Bryn Mawr College in 1903 to succeed Professor Harkness, now professor of mathematics in McGill University. He was the author of numerous papers dealing with a wide range of subjects in the field of higher mathematics, such as the theory of groups, Abelian theta functions, and differential geometry of space. In 1908 his treatise on "Invariants of Quadratic Differential Forms" was published by the Cambridge University Press.

MR. WILFRED STALKER, member of the British Ornithologists' Union to Dutch New Guinea, has been drowned. Mr. Stalker, who was only thirty-one years of age, had displayed much ability as a collecting naturalist.

THE death is announced of Dr. W. Krause, docent in anatomy at Berlin.

THE French Association for the Advancement of the Sciences will hold its thirty-ninth annual meeting at Toulouse in August under the presidency of M. Gariel, professor of biological physics in the faculty of medicine of the University of Paris.

THE Blue Hill Meteorological Observatory, in Milton, Mass., founded and maintained by Professor A. Lawrence Rotch, has just completed twenty-five years' work. The initial investigations of the upper air, undertaken there in the interest of pure science, are now of practical value to aeronauts and aviators.

THE division of physical sciences of the Royal Academy of Bologna calls attention to an international competition for a biennial prize of three thousand lire established from the income of a donation made by one of its

corresponding members, Professor Elia De Cyon, with the object of promoting researches in the subjects in which he has worked. This award will be conferred on competitors whose works treat: (1) The functions of the heart, and, above all, of the cardiac and vaso-motor nervous systems; (2) the functions of the labyrinth of the ear; (3) the functions of the thyroid glands of the hypophyses and of the pineal gland. The first prize will be awarded on March 1, 1911.

THE first ordinary meeting of the society formed by the amalgamation of the Society of Engineers and the Civil and Mechanical Engineers' Society, was held in London on February 7, when Mr. Diogo A. Symons, the first president of the new society of engineers, delivered an inaugural address.

THE Royal Meteorological Society held a meeting at the physical laboratory, Manchester University, on February 23. This meeting was the first the society has held out of London. Papers were read describing the investigations made at the Howard Estate Observatory, Glossop, into the electrical state of the upper atmosphere, and also on the hourly registering balloon ascents which were made from Manchester on June 2-3, 1909. Mr. Lempfert and Mr. Corless will also contribute a paper on "Line-squalls and Associated Phenomena."

ACCORDING to a communication made on February 14 to the Paris Academy of Sciences by M. Lippmann and reported in the *London Times*, Mme. Pierre Curie, the widow of M. Pierre Curie, the discover of polonium and radium, has at last succeeded in isolating one tenth of a milligram of polonium. In order to obtain this result Mme. Curie, working in cooperation with M. Debierne, has had to treat several tons of pitchblende with hot hydrochloric acid. The radio-active properties of polonium turn out to be far greater than those of radium. It decomposes chemically organic bodies with extraordinary rapidity. When it is placed in a vase made of quartz, which is one of the most refractory of substances, it cracks the vessel in a very short

time. But a no less distinctive quality of polonium is the comparatively rapid rate at which it disappears. Whereas it takes one thousand years for radium to disappear completely a particle of polonium loses 50 per cent. of its weight in 140 days. The products of its disintegration are helium and another body, the nature of which has not yet been ascertained, but Mme. Curie and M. Debierne are inclined to believe it to be lead. Its identity, however, will shortly be established, and at the same time science will have had the experimental proof of the transformation of a body which had been believed to be elementary.

A COURSE of nine illustrated lectures upon science and travel has been arranged by the Field Museum of Natural History at the Art Institute for Saturday afternoons in March and April, at three o'clock, as follows:

March 5—"Snapping Live Game on the Roosevelt Hunting Trail," Mr. A. Radclyffe Dugmore, New York City.

March 12—"The Call of the West," Mr. C. J. Blanchard, Statistician, U. S. Reclamation Service.

March 19—"Mongolia and Siberia," Professor Roland B. Dixon, Harvard University.

March 26—"Our Forests and What They Mean," Dr. Charles F. Millsbaugh, curator, Department of Botany.

April 2—"Cliff Dwellers and Pueblos," Mrs. Gilbert McClurg, regent general, The Colorado Cliff Dwellers Association.

April 9—"Some Alaskan Glaciers," Professor U. S. Grant, Northwestern University.

April 16—"Fossil Hunting," Mr. E. S. Riggs, assistant curator, Division of Paleontology.

April 23—"Human Development and Evolution," Dr. Frank R. Lillie, University of Chicago.

April 30—"The Colorado River," Professor O. C. Farrington, curator, Department of Geology.

WE learn from the *Journal* of the American Medical Association that the first biennial meeting of the Far-Eastern Association of Tropical Medicine is to be held in Manila, March 5-14, 1910. The association was established with the idea of bringing together workers in tropical medicine in that part of the world, and is important in that it brings English-speaking scientific workers together for mutual social and scientific improvement.

The sessions in Manila will be held in the new building of the Philippine Medical School near the Bureau of Science and the new Government Hospital. The sessions in Baguio will be held in one of the government buildings. The government has appropriated a liberal sum for entertainment of guests during the meeting. Visits have been arranged to points of interest in the neighborhood. The museums of the Bureau of Science and of the Philippine Medical School will be thrown open and demonstrations of the specimens will be given. There will be a commercial exhibit of remedial appliances and medical equipment appropriate for use in the tropics.

PRESIDENT DAVID STARR JORDAN, of Stanford University, has addressed to President Charles R. Van Hise, of the University of Wisconsin, the following letter:

Will you permit me a word in regard to reform in football? I believe that no reform worth consideration is possible so long as the game allows the play known as "interference," by the legalization of which the Rugby Game was some twenty years ago perverted into the "American Game." As results of the legalization of "offside play" or "interference," forbidden in Rugby, we have the four most objectionable features of the American Game, (a) mass play and "downs," (b) low tackling in the open field, (c) play directed to break down individuals of the opposite side, (d) the domination of professional coaches, whose interests are wholly at variance with those of the university.

In 1904, at the height of the football obsession in California, the presidents and committees on athletics of the two universities notified the students that no form of football having mass play would be again permitted. The students then adopted the Rugby game. It has been tested for five seasons, and it is wholly satisfactory to all concerned. The game demands a much higher grade of skill and alertness. It is far more interesting to watch. It is interesting to the players. It is a sport and not a battle. As with baseball, so with Rugby, each player must know the game. It is played not in armor, but in cotton knee-breeches, and there have been in five years no injuries of any consequence.

The game is now played in the universities and colleges of California and Nevada. It attracts (perhaps unfortunately) larger numbers of spec-

tators than the old game ever did. It is now played in most of the leading high schools of California. It is firmly and permanently established on the Pacific Coast, unless, as in the East, it is modified to suit the purposes of professional coaches. It seems to me that our experience in California should be worth something to our colleagues in the East.

Very truly yours,

DAVID STARR JORDAN

UNIVERSITY AND EDUCATIONAL NEWS

THE medical school of the University of Pennsylvania has been given \$100,000 by an unnamed alumnus to endow a chair to be known as "the Benjamin Rush professorship of physiological chemistry."

THE valuable library on mathematics and science of the late Oren Root, for many years professor of mathematics at Hamilton College, has been presented to the college by his son, Mr. Elihu Root.

THE dedication of three new engineering buildings at the University of Kansas occurred on February 25. The buildings are those provided for by the legislature of 1907, and are a general engineering building, housing the departments of civil and mechanical engineering and, as a temporary matter, the department of electrical engineering; a mining and geology building, and the mechanical laboratory and power plant. In the afternoon, at 2:30, addresses were given by Dean Frank O. Marvin, Dr. Richard C. Maclaurin, president of the Massachusetts Institute of Technology, and Mr. Ernest R. Buckley, president of the American Mining Congress. Following these were the dedication ceremonies, under the direction of Chancellor Frank Strong. In the evening a banquet was held at Robinson Gymnasium, with after-dinner speeches.

THE Dutch government has appropriated \$100,000 for a laboratory of physical and mineral chemistry at Groningen, where Professor F. M. Jaeger is head of the department.

DR. BERTRAM E. BOLTWOOD has been elected professor of radio-chemistry in the graduate school of Yale University.

PROFESSOR SEITARO GOTO has been called to the chair of zoology at the Tokyo Imperial University to succeed the late Professor Kakichi Mitsukuri. Naohide Yatsu, Ph.D. (Columbia), has been appointed assistant professor. Katashi Takahashi, Ph.D. (Chicago), has been appointed to the professorship of zoology at the First High School to fill the vacancy caused by the resignation of Professor Goto.

DISCUSSION AND CORRESPONDENCE

A SUBSTITUTE FOR CROSS WIRES IN THE SPECTROSCOPE

TO THE EDITOR OF SCIENCE: Should any of the readers of SCIENCE be in possession of spectrosopes which are unprovided with cross wires, it may interest them to learn of a cheap method of supplying a substitute for such desirable articles, which has been found of service in this laboratory, and which, so far as the writer knows, has not hitherto been published.

The method consists in inserting, either in the ocular, or telescope tube, at the proper focal point, a thin glass disc on which is etched a cross with lines about as heavy as the wires in an ordinary cross wire eyepiece. This cross, when in focus, appears as perfectly opaque lines, which fully answer the purpose of cross wires.

These discs have been in use here for some time, and their working has been compared with that of the regular cross wire eyepieces without any difference between the two being noticed. In fact, the cross wires of one of our instruments being somewhat too heavy, we removed them, and substituted a ruled disc with manifest gain in ease of working. The glass disc does not seem to obscure any portion of the spectrum; all portions, both of emission and absorption spectra, having been observed therethrough with instruments of various powers, both prism and grating, without any appreciable loss of either brightness or definition.

For observing a bright line spectrum it is